CLAIMS

What is claimed is:

1. A liquid crystal display (LCD) panel comprising:

a liquid crystal panel in which liquid crystal is filled between upper and lower substrates and the liquid crystal is in communication with a display electrode and a common electrode which face each other;

a first driving circuit connected to the liquid crystal panel by a plurality of data lines and which applies a data signal to the liquid crystal panel;

a second driving circuit connected to the liquid crystal panel by a plurality of gate lines and which applies a scan signal to sequentially apply the data signal to the liquid crystal panel;

an electrode pad unit which applies an alignment signal voltage to the liquid crystal panel for alignment of the liquid crystal filled in the liquid crystal panel;

a first switching circuit which performs a switching operation to apply the alignment signal voltage applied via the electrode pad unit to the liquid crystal panel via the data lines;

a second switching circuit which performs a switching operation to apply the alignment signal voltage applied via the electrode pad unit to the liquid crystal panel via the gate lines; and

first and second buffer circuits, which prevent the alignment signal voltage from being applied to the first and second driving circuits.

2. The LCD panel of claim 1, wherein the first switching circuit is placed between the first driving circuit and the liquid crystal panel.

3. The LCD panel of claim 1, wherein the second switching circuit is placed between the liquid crystal panel and the electrode pad unit.

4. The LCD panel of claim 1, wherein the second switching circuit is placed between the second driving circuit and the liquid crystal panel.

5. The LCD panel of claim 2, wherein the first buffer circuit is placed between the first driving circuit and the first switching circuit.

6. The LCD panel of claim 3, wherein the second buffer circuit is placed between the second driving circuit and the liquid crystal panel.

7. The LCD panel of claim 4, wherein the second buffer circuit is placed between the second driving circuit and the second switching circuit.

8. The LCD panel of claim 1, wherein the first switching circuit faces the first driving circuit with the liquid crystal panel being placed between the first switching circuit and the first driving circuit.

9. The LCD panel of claim 8, wherein the second switching circuit is placed between the liquid crystal panel and the electrode pad unit.

10. The LCD panel of claim 8, wherein the second switching circuit is placed between the second driving circuit and the liquid crystal panel.

11. The LCD panel of claim 8, wherein the first buffer circuit is placed between the first driving circuit and the liquid crystal panel.

12. The LCD panel of claim 1, wherein the electrode pad unit comprises:
first and second electrode pads connected to the first switching circuit;
a third electrode pad connected to the common electrode; and
fourth and fifth electrode pads connected to the second switching circuit.

13. The LCD panel of claim 1, wherein the first buffer circuit includes a plurality of signal backflow prevention elements, each connected to the respective corresponding plurality of data lines.

14. The LCD panel of claim 1, wherein the second buffer circuit includes a plurality of signal backflow prevention elements each connected to the respective corresponding plurality of gate lines.

15. The LCD panel of claim 1, wherein the first switching circuit includes a plurality of transistors, each connected to the respective corresponding data lines.

16. The LCD panel of claim 1, wherein the second switching circuit includes a plurality of transistors, each connected to the respective corresponding gate lines.

17. The LCD panel of claim 2, wherein the second switching circuit is placed between the liquid crystal panel and the electrode pad unit.

18. The LCD panel of claim 2, wherein the second switching circuit is placed between the second driving circuit and the liquid crystal panel.

19. A liquid crystal display panel, comprising:

a liquid crystal panel comprising a plurality of pixels in liquid crystal to display images;

a driving circuit supplying signals to the plurality of pixels to control the display images;

an electrode unit to supply an alignment signal voltage to the liquid crystal panel;

a switching circuit selectively switching the alignment signal voltage from the electrode unit to the liquid crystal display panel to align liquid crystal in the liquid crystal panel; and

a buffer circuit connected to the driving circuit to prevent the alignment signal voltage from flowing to the driving circuit.

20. The liquid crystal display panel of claim 19, wherein the liquid crystal is ferroelectric liquid crystal.

21. A liquid crystal display panel, comprising:

a liquid crystal panel;

a first driver supplying image signals to data lines;

a second driver supplying scan signals to gate lines which intersect the data lines to form a matrix in the liquid crystal panel;

an electrode unit supplying an alignment signal voltage to the liquid crystal panel;

a switching circuit selectively switching the alignment signal voltage from the electrode unit to align liquid crystal in the liquid crystal panel; and

a buffer circuit coupled to the first driver and the second driver to prevent the alignment signal voltage from flowing to the first driver and the second driver.

22. The liquid crystal display panel of claim 21, wherein the switching circuit selectively switches the alignment signal voltage to be applied on the data lines; and

the liquid crystal display panel further comprising a second switching circuit which selectively switches the alignment signal voltage to be applied on the gate lines.

23. The liquid crystal display panel of claim 21, wherein the buffer circuit comprises signal backflow prevention elements connected to each of the data lines and each of the gate lines.

24. The liquid crystal display panel of claim 21, wherein the liquid crystal panel comprises an upper glass substrate, a lower substrate, and a layer of liquid crystal contained between the upper glass substrate and the lower substrate, the lower substrate comprises switching elements selectively switching the image signals and the scan signals and display electrodes coupled to respective switching elements forming pixels in a matrix shape, the upper glass substrate comprises transparent common electrodes at a rear side of the upper glass substrate corresponding to each display electrode.

25. The liquid crystal display panel of claim 24, further comprising:

an alignment fixing unit holding the liquid crystal display panel and applying the alignment signal voltage to the liquid crystal panel, wherein during injection of liquid crystal between the upper glass substrate and the lower substrate the alignment signal voltage is applied to align the liquid crystal in a predetermined orientation.

26. The liquid crystal display panel of claim 25, wherein the alignment fixing unit comprises a flat lower plate to support the liquid crystal display panel, a rotatable upper plate having signal terminals and contact members, which interface with the electrode unit when the upper plate is rotated over the liquid crystal display panel to restrain the liquid crystal display panel in the alignment fixing unit.

27. A liquid crystal display panel processing device to process liquid crystal display panels each liquid crystal display panel comprising, a liquid crystal panel, a first driver supplying image signals to data lines, a second driver supplying scan signals to gate lines which intersect the data lines to form a matrix in the liquid crystal panel, an electrode unit receiving an alignment signal voltage and supplying the alignment signal voltage to the liquid crystal panel, a switching circuit selectively switching the alignment signal voltage from the electrode unit to align liquid crystal in the liquid crystal panel, and a buffer circuit coupled to the first driver and the second driver to prevent the alignment signal voltage from flowing to the first driver and the second driver, the processing device comprising:

a plurality of alignment fixing units holding liquid crystal display panels and applying the alignment signal voltage to the liquid crystal display panel via the electrode unit, wherein during injection of liquid crystal into the liquid crystal panel the alignment signal voltage is applied to align the liquid crystal in a predetermined orientation.

28. The liquid crystal display panel processing device of claim 27, further comprising:

a vacuum chamber to draw a vacuum in the chamber;

a movable jig disposed inside the vacuum chamber removably holding the plurality of alignment fixing units;

a liquid crystal tray containing liquid crystal; and

a controller to control the movement of the jig and application of the alignment signal voltage, wherein the plurality of alignment fixing units are suspended above the liquid crystal so that when the jig is moved down a predetermined distance an injection hole of the liquid crystal panels are in communication with the liquid crystal so that under vacuum the liquid crystal is injected into the liquid crystal panels and are aligned in the predetermined orientation by application of the alignment signal voltage.

29. A method of aligning liquid crystal in a liquid crystal display panel, comprising:

generating an alignment signal voltage to align liquid crystal in a predetermined orientation;

filling the liquid crystal into a liquid crystal display panel having an electrode unit to receive the alignment signal voltage; and

applying the alignment signal voltage to the electrode unit of the liquid crystal display panel during the filling the liquid crystal.

30. The method of claim 29, wherein the filling the liquid crystal comprises:

creating a vacuum around the liquid crystal display panel; and

submerging an injection hole of the liquid crystal display panel into liquid crystal, wherein liquid crystal fills the liquid crystal display panel.

31. The method of claim 30, wherein the applying the alignment signal voltage occurs as the liquid crystal is injected into the liquid crystal display panel.

32. The method of claim 30, wherein the applying the alignment signal voltage occurs after packaging of the liquid crystal display panel.